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Abstract

The level of usage, appropriateness, and effectiveness of electronic mail within the Virginia Cooperative Extension Service was studied. More than 20,000 electronic mail records and the contents of 200 electronic mail messages were analyzed. We determined that, during the past 12 months, a minimum of 13,000 notes were routed electronically from campus staff to county and city Extension offices. The most frequent type of message sent was a request for information. We also learned that more than 95% of the field offices respond to electronic mail within three working days. We concluded from the study results that electronic mail is a fairly common communication method in Virginia and Extension staff generally are making appropriate use of electronic mail.

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by Thomas R. McAnge, Jr.
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Introduction

The Virginia Cooperative Extension Service (VCES) has 119 field offices—107 county/city offices, six district offices, and six 4-H educational centers. Since July 1985, field offices have had at least one microcomputer workstation with the capability to link to Virginia Tech's central computer. The mainframe connection in each office provides a means for all Extension offices, campus and field, to communicate electronically using the central computer electronic mail software.

During 1986, the Extension administration strongly urged staff to use electronic mail, and often sent important messages to staff electronically to demonstrate its commitment to electronic communications. During 1987, electronic mail traffic within the Extension organization significantly increased and questions were raised about the cost, effectiveness, and appropriateness of electronic mail. For example, the Extension Division's Communication Task Force (1987) reported that "computer garbage is cluttering the system."

While examples of electronic mail use by Exxtension can be cited, there are no current data that characterize Extension's comprehensive use of electronic mail. Virginia Tech's 1987 Self-Study suggested that "The University conduct a comprehensive analysis of the purposes and uses of telecommunications technologies in serving the various clientele(s) of its Extension missions." And the National Extension Futures Task Force (1987) recom-

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mended that "Extension should use the most effective and efficient communication methods for program delivery."

This study was undertaken to collect the necessary data to characterize the use of electronic mail in the organization. It includes analysis of electronic mail traffic, content, and response rate within VCES.

Electronic Mail Traffic

An important aspect of the study was to analyze the volume of electronic mail traffic within the Extension organization. The traffic analysis was designed to determine the number of electronic mail messages being sent and any trends that might exist.

The electronic mail system of Virginia Tech's host computer has a feature to record electronic mail traffic. A record of every electronic note or transferred file that is sent or received by a computer user is saved as a NETLOG file. The NETLOG records include the user's identification (userid), the type of file transferred, whether the message was sent or received, and the date and time of the transaction. The NETLOG records were analyzed to answer questions about the electronic mail traffic to and from the Extension unit offices. More than 75,000 records were collected for the study.

The electronic mail traffic study included messages transferred between campus, six district offices, 119 county and city offices (unit offices), and six 4-H educational centers.

The state is divided into six geographical areas, identified as Extension districts. A district office is located in each area and is staffed with a district director and program directors. The districts range in size from 15 to 23 units. Electronic mail traffic at district offices was studied because the district offices are the major communication channel to the other field offices.

Some specific findings related to electronic mail traffic include:

- During the past 12 months, a minimum of 13,000 electronic notes were sent from campus users to unit offices. For the same period, a minimum of 3,000 messages was sent from unit offices to campus via the computer.
- Because of incomplete data, it was difficult to determine trends in electronic mail traffic. However, for the 40 offices with at least 18 months of data, traffic *to* unit offices increased 2.7 times between the last 6 months of 1986 and the same period for 1987. Electronic mail traffic *from* unit offices has remained stable.
- District offices sent an average of between 6.6 and 15.5 electronic messages to unit offices per month per unit.
- The average number of electronic messages sent to the district offices from unit offices was between 0.8 and 2.0.
- The heaviest electronic mail traffic between Virginia Tech campus users and the district offices was from the Director of Field Services (the district offices' supervisor) to the district offices. On the average, between 10.7 and 19.5 messages per month were sent from the Field Services Office to each district office. Between 2.3 and 5.2 messages per month were sent from the district offices to the Field Services Office.
- The electronic mail traffic from program leadership offices (associate and assistant directors) to the district offices averaged between 16.7 and 24.0 messages per month. The majority of the program leadership traffic was from the 4-H Department (between 6.0 and 10.2 messages per month).

Content Analysis

The content of electronic messages was collected and analyzed to determine the way electronic mail was being used within the Extension organization. For a 3-month period, the contents of all computer files transferred between users of Extension's electronic mail distribution lists were collected. These lists include seven major lists, one for all field offices and one for the offices in each of the six districts. During the study period, a study userid was added to these lists; therefore, whenever a distribution list was used, the message was also routed to the study userid.

Each of the electronic messages was read initially to develop a list of content codes. Then, all messages were read again by both authors and each message was coded for program area (4-H, Agriculture and Natural Resources, Community Resource Development, or Home Economics), type of distribution (statewide or within a district), and content. Content categories include:

Administrative Announcements: Administrative or program management information.

Changes in Program Announcements: Program agenda or time changes, cancellations, or postponements.

Personal Announcements: Retirements and illness of staff or retirees.
Phone and Address Changes: Changes in telephone numbers and addresses.
Professional Announcements: Information about Extension professional associations and meeting notices.

Program Announcements: Extension programs for staff.
Reminders: Program or meeting notices.
Requests for Information: Requests for information, materials, or publications.

Timely Subject-Matter Information: Assistance to Extension agents in responding to unexpected situations.

Of the nine content categories identified, the most frequent type of message sent was a request for information (24%) (Table 1). The remaining messages were fairly evenly distributed among all but two of the categories—phone and address changes (1.9%) and timely subject-matter information (1.4%). It was surprising that electronic mail was used so sparingly to deliver timely subject-matter information, since electronic mail can save time.

Of the electronic mail related to program areas (Table 2), one in four messages was 4-H program related, and almost half (43.5%) was not related to any program area. The mail not related to a program area included administrative announcements, personal announcements, phone and address changes, changes in announçements, requests for information, and reminders that were related to administrative information.

Sixty-eight percent of the electronic mail in the content analysis was sent using a district distribution list, with 32% distributed statewide. And, although the length of the messages was not precisely measured, we observed that more than 95% was less than one page. In fact, the majority was one paragraph long.

Table 1. Electronic Mail Content Analysis—Categories of Mail Content

Category	Number of messages	Percent of total
Administrative announcements	23	11.0
Changes in program announcements	25	12.0
Personal announcements	24	11.4
Phone and address changes	4	1.9
Professional announcements	20	9.6
Program announcements	29	13.9
Reminders	31	14.8
Requests for information	50	24.0
Timely subject-matter information	3	1.4
Total	209	100%

Response Time

Sproull and Kiesler (1986) state: "Most analyses of electronic mail view it simply as an information accelerator, a tool that reduces the amount of time it takes for people to get information they otherwise would have received more slowly." It is not known if electronic mail does, in fact, speed the transfer of information within the Extension organization. Some of the early adoption patterns may still be contributing to a perception that most field offices only periodically check their electronic mailboxes. A component of this study was to determine field offices' response time to electronic mail.

To measure response time, an electronic note was sent to all field offices on two occasions. The message explained that the electronic note was part of an electronic mail study. When the note was read, an acknowledgement message was electronically returned to one of the authors. This collection of acknowledgement records was the data base used for the response time study. The acknowledgement files contained the date and time of the original note, the date and time the note was received, and the userid that received the note.

The majority of field offices responded within one day of receiving the study note—65.3% for the first note and 87.2% for the second note (Table 3). In each case, all but one office responded within 5 days. Ninety-seven

Table 2. Electronic Mail Content Analysis—Mail Content by Program Areas

Program area	Number of messages	Percent of total
Agriculture and natural resources	41	19.5
Community resource development	4	2.0
4-H	50	24.0
Home economics	23	11.0
Not related to program area	91	43.5
Total	209	100%

percent of the offices responded in 2 days. The one office that did not respond to either test note was unable to access the electronic mail system because of an equipment failure.

Table 3. Electronic Mail Response: Working Days Between Note Being Sent and Acknowledgement

Working days to respond	First Note		Second Note	
	#	%	#	%
1	81	65.3	109	87.2
2	21	81.6	11	96.0
3	19	96.8	2	97.6
4	2	98.4	2	99.2
5	1	99.2	0	99.2
no response	1	100%	1	100%

Conclusions

Electronic mail is a fairly common one-way communication method within the Virginia Cooperative Extension Service.

Although no appropriate comparative data exist, the volume of electronic mail was significant, particularly from the campus to unit offices and between campus and the district offices. It could have been predicted that the volume of electronic mail traffic from campus to units would be greater than electronic mail to all unit offices using a distribution list. Distribution lists are not available to groups of campus computer users, nor would it be likely that a unit office would need to communicate with all campus or all other Extension field offices.

The greatest use of electronic mail within the organization is from the Director of Field Services and the Assistant Directors for Programs to the District Offices.

The volume of traffic between the district offices and the campus directors (program and administrative) also could be predicted because that line of communication is the organizational link between campus and off-campus staff. Also, the geographical decentralization of staff minimizes the opportunities for face-to-face communication, making electronic mail a communication alternative along with telephone and hard copy mail.

The volume of electronic mail traffic appears to have stabilized, indicating that it has reached a level consistent with the current level of adoption of computer technology.

The volume of electronic mail traffic has slowly grown over the past 4 years, but the data for the past 18 months show no significant change. This leveling of electronic mail traffic could be explained by the lack of any signifi-

cant computer training and minimum procurement of additional computer equipment during the past 24 months. Mainframe computer usage has decreased by 50% during the past 18 months, and staff have increased their use of microcomputers.

Extension staff generally are making appropriate use of electronic mail.

In the Virginia Extension organization, short (one-two paragraphs) messages with timely information are considered appropriate for electronic mail. More than 65% of the electronic mail analyzed was related to timely information, i.e., program changes, personal announcements (mostly health), phone or address changes, reminders, and requests for information. Program announcements (13.9%) might have been handled in other ways with sufficient planning. The professional meeting announcements (9.6%) probably were handled electronically to expedite an unrewarding task. The use of electronic mail for administrative announcements has increased with the advent of computer communication systems because it provides an opportunity for increased communication to staff in a decentralized structure.

Extension staff in field offices are checking their electronic mailboxes on a regular basis, making electronic mail an effective method for the transfer of timely information.

Almost all field offices receive electronic mail within 3 days. If the electronic mail content is timely and useful, it should receive priority routing within the offices. Although hard-copy mail or material can be shipped by UPS and received within 24 hours, correspondence, similar to electronic mail, could not be prepared, copied, packed, shipped, received, and sorted in the short period that electronic mail is handled.

Ulrich (1986) boldly states: "Half of all telephone calls and letters are subject to being displaced by E-mail [electronic mail]. With even modest economic improvements, the technology will be the rule, rather than the exception, by 1989." This indeed could be the case for the Extension organization in the near future.

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